

REMARKS

Claims 1-10 remain cancelled, claims 11 and 18-20 have been amended, while the limitations of claim 12 have been added to claim 11, and claim 12 has been cancelled. The remaining claims are unchanged. No new subject matter is believed to have been added by this Amendment.

The limitations of claim 12 have been added to claim 11, and it is for this reason that claim 12 has been cancelled, and amendments to claims 18-20 have been made to adjust their dependency.

On page 4 of the Office Action, the Examiner rejects claims 11, 12, 15, 16, and 18 under 35 U.S.C. §102(e) as being anticipated by the teaching of United States Patent No. 6,817,193 to Caesar, et al. (the "Caesar Patent"). The Caesar Patent is directed to a method of operating a refrigerant circuit and discloses two different cases. In one case, illustrated in Fig. 2, a liquid/gas mixture enters the evaporator (5) within the saturated vapor region quite far from the left-hand limit curve of the lg p-h diagram (Z5). The liquid phase is not fully evaporated at Z6/7 at the entrance of the heat exchanger (9). Therefore, the heat exchanger (9) provides a second evaporation stage.

In the second case, illustrated in Fig. 7, a liquid/gas mixture enters the evaporator (5) as a saturated vapor not very far from the left-hand limit curve of the lg p-h diagram (Z5). However, the heat exchanger (9) does not take part in the evaporation process since Z6/7 lies in the superheated gas area well outside the liquid/gas saturation area.

Additionally, the Caesar Patent discloses, in Lines 1-3 of Column 5, that the expansion valve is constant but a restrictor means adjacent to the expansion valve controls the flow.

With respect to the subject invention, as illustrated in Fig. 8, the evaporation starts essentially on the left-hand limit curve of the lg p-h diagram (12) with the evaporator. A second evaporation step within the internal heat exchanger (5) begins at 19/20 inside the saturation area and ends well outside this area at 21.

Of particular interest, the refrigerant is in a liquid state even after it leaves the expansion valve (3) as it enters the evaporator (4). As stated in lines 24-32 on page 4 of the specification, with "optimized" evaporator designs, the evaporation process is started as close as possible to the left-hand limit curve of the lg p-h diagram. This permits the maximum latent heat of vaporization to be extracted from the refrigerant as it changes phases from

liquid to gas.

Therefore, the evaporation is optimally utilized by receiving a supercooled, or nearly supercooled liquid, and evaporating that liquid along the entire length of the evaporator, at which point the less efficient internal heat exchanger completes the phase change of the refrigerant to a gas.

As stated on Page 7, Lines 21-38 of the specification, the evaporation system with dry expansion is used as a flooded evaporator (4), in which refrigerant leaves the evaporator (4) in the first stage with liquid fractions (17, 19).

The refrigerant enters a second evaporation stage (7, 18, 20) (dry evaporator) as a liquid/gas mixture with a high gas content and residual evaporation with subsequent high superheating of the refrigerant (13). Control of the evaporation process is based on the start of evaporation (12) and not at the end of evaporation (13).

Claim 11 not only specifies that the expansion valve itself is controlled, but has been further amended to further specify these features, including the introduction of the internal heat exchanger from claim 12.

For these reasons the Applicant does not believe that claim 11, as amended, is anticipated by or made obvious by the teaching of the Caesar Patent.

By way of their dependence upon what is believed to be patentably distinct independent claim 11, dependent claims 15, 16, and 18 are themselves believed to be patentably distinct over the teaching of the Caesar Patent.

On page 6 of the Office Action, the Examiner rejects claims 17 and 21 under 35 U.S.C. §103 (a) as being obvious from the teaching of the Caesar Patent, in view of the teaching of Japanese Patent No. JP-2002267279 to Yoshihiko. By way of their dependence upon what is believed to be patentably distinct independent claim 11, dependent claims 17 and 21 are themselves believed to be patentably distinct over the prior art of record.

On page 7 of the Office Action, the Examiner rejects claims 13 and 14 under 35 U.S.C. §103(a) as being obvious from the teaching of the Caesar Patent, in view of the teaching of European Patent No. EP-1014013 to Shunji et al. Once again, by way of their dependence upon what is believed to be patentably distinct independent claim 11, dependent claims 13 and 14 are themselves believed to be patentably distinct over the prior art of record.

On page 8 of the Office Action, the Examiner rejects claims 18-20 and 22-26 under 35 U.S.C. §103(a) as being obvious from the teaching of the Caesar Patent, as applied to claim 11 above. Once again, by way of their dependence upon what is believed to be patentably


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distinct independent claim 11, dependent claims 18-20 and 22-26 are themselves believed to be patentably distinct over the prior art of record.

Reconsideration and allowance of pending claims 11 and 13-26 are respectfully requested.

Respectfully submitted,

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